



## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

<p>(51) International Patent Classification <sup>6</sup> : <b>A61B 17/39, A61M 25/01</b></p>	<p><b>A3</b></p>	<p>(11) International Publication Number: <b>WO 99/47058</b> (43) International Publication Date: 23 September 1999 (23.09.99)</p>
<p>(21) International Application Number: <b>PCT/US99/06092</b> (22) International Filing Date: 19 March 1999 (19.03.99) (30) Priority Data: 60/078,545 19 March 1998 (19.03.98) US (63) Related by Continuation (CON) or Continuation-in-Part (CIP) to Earlier Application US 60/078,545 (CIP) Filed on 19 March 1998 (19.03.98) (71) Applicant (for all designated States except US): ORATEC INTERVENTIONS, INC. [US/US]; 3700 Haven Court, Menlo Park, CA 94025 (US). (72) Inventors; and (75) Inventors/Applicants (for US only): ASHLEY, John, E. [US/US]; 184 Burlwood Drive, San Francisco, CA 94127 (US). SHARKEY, Hugh, R. [US/US]; 150 Normandy Lane, Woodside, CA 04062 (US). SAAL, Joel [US/US]; 46 Vista Verde Way, Portola Valley, CA 94028 (US). SAAL, Jeffrey [US/US]; 95 Sausal Drive, Portola Valley, CA 94028 (US).</p>		<p>(74) Agent: CARY, Charles, C.; Wilson Sonsini Goodrich &amp; Rosati, 650 Page Mill Road, Palo Alto, CA 94304-1050 (US). (81) Designated States: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).  Published With international search report. Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments. (88) Date of publication of the international search report: 11 November 1999 (11.11.99)</p>
<p>(54) Title: CATHETER FOR DELIVERY OF ENERGY TO A SURGICAL SITE</p>		
<p>(57) Abstract</p> <p>A catheter for delivering energy to a surgical site is disclosed. The catheter includes at a proximal end a handle and at a distal end a probe. The catheter includes at least one energy delivery device and an activation element. The at least one energy delivery device is located at the distal end of the catheter to deliver energy to portions of the surgical site. The activation element is located at the distal end of the catheter, to transition the probe from a linear to a multi-dimensional shape, within the surgical site. Methods for deploying the probe from the linear to multi-dimensional shape are disclosed. In another embodiment of the invention the catheter includes a heating element fabricated on a substrate by photo-etching to deliver thermal energy to portions of the surgical site. In another embodiment of the invention the catheter includes an energy delivery element, a tip and a blade. The energy delivery element is located at the distal end of the catheter to deliver energy to portions of the intervertebral disc. The blade is positioned within a first lumen of the tip and is extensible beyond the tip, to cut selected portions within the intervertebral disc. In another embodiment of the invention a catheter includes both energy and material transfer elements and an interface on the handle thereof. The interface couples the energy delivery element and the material transfer element to external devices for energy and material transfer to and from the intervertebral disc.</p>		

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# INTERNATIONAL SEARCH REPORT

Internat. Application No

PCT/US 99/06092

A. CLASSIFICATION OF SUBJECT MATTER  
IPC 6 A61B17/39 A61M25/01

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 A61B A61M

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P,X	WO 98 17190 A (ASHLEY JOHN ; LE LE T (US); SALL JOEL (US); SAAL JEFFREY (US); SHAR) 30 April 1998 (1998-04-30) the whole document	1-20
X	EP 0 737 487 A (CARDIORHYTHM) 16 October 1996 (1996-10-16) abstract; figures 2,5,10	1,8,18, 19
X	EP 0 682 910 A (GUENTHER ANITA ; BERTAGNOLI RUDOLF DR MED (DE); TIEBER FRIEDRICH (D) 22 November 1995 (1995-11-22) column 3, line 31 - line 58 column 5, line 7 - line 19 column 6, line 48 -column 7, line 11; figures 1,3,6,7	1,18

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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"P" document published prior to the international filing date but later than the priority date claimed

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Date of the actual completion of the international search

16 June 1999

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29. 09. 99

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# INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 99/06092

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5 279 559 A (BARR IRWIN R) 18 January 1994 (1994-01-18) column 4, line 11 - line 44 claim 1; figure 2 ---	1,4,12
A	WO 96 34559 A (CORDIS WEBSTER INC) 7 November 1996 (1996-11-07)  page 6, line 1 -page 8, line 26; figures 1,8 ---	1-3,5,6, 9-11,13, 14,16, 18-20
A	WO 92 05828 A (RAYCHEM CORP) 16 April 1992 (1992-04-16) page 14, line 14 -page 15, line 14; figures 21,212,312,72 abstract ---	1-3,5,6, 8-11,14
A	WO 96 32885 A (DESAI JAWAHAR M) 24 October 1996 (1996-10-24) page 2, line 1 - line 26; figures 2A,2B ---	1,15
A	US 5 415 633 A (LAZARUS KENNETH B ET AL) 16 May 1995 (1995-05-16) abstract; figures 1,5 ---	1,7
A	US 5 152 748 A (CHASTAGNER PHILIPPE) 6 October 1992 (1992-10-06) column 2, line 1 - line 31; figures 2,3 ---	1,4,12
A	US 4 846 175 A (FRIMBERGER ECKART) 11 July 1989 (1989-07-11) abstract; figures 1,2 ---	1,8
A	US 5 114 402 A (MCCOY WILLIAM C) 19 May 1992 (1992-05-19) abstract; figures 1,6,12-14 ---	1,5
A	US 5 433 739 A (SLUIJTER MENNO E ET AL) 18 July 1995 (1995-07-18) cited in the application abstract; figure 1 -----	1

# INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 99/06092

## Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☒ Claims Nos.: **claims: 30-33**  
because they relate to subject matter not required to be searched by this Authority, namely:  
**Rule 39.1(iv) PCT - Method for treatment of the human or animal body by surgery**
2. ☐ Claims Nos.:  
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see add. sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1-20

Remark on Protest

☐ The additional search fees were accompanied by the applicant's protest.

☐ No protest accompanied the payment of additional search fees.

# INTERNATIONAL SEARCH REPORT

International Application No. PCT/US 99/06092

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

## 1. Claims: 1-20

### Independent claim 1:

A catheter for delivering energy to an intervertebral disc, said catheter including at an proximal end a handle and at a distal end a probe, said catheter further comprising: at least one energy delivery device located at the distal end of the catheter to deliver energy to portions of the intervertebral disc; and an activation element located at the distal end of the catheter, to transition the probe from a linear to a multi-dimensional shape, within the intervertebral disc.

## 2. Claims: 21-24

### Independent claim 21:

A catheter for delivering energy to an intervertebral disc, said catheter including at a proximal end a handle and at a distal end a probe, said catheter further comprising: a substrate located at the distal end of the catheter; and a heating element adapted to deliver thermal energy to portions of the intervertebral disc, said heating element fabricated on said substrate by a photo-etching.

## 3. Claims: 25-28

### Independent claim 25:

A catheter for delivering energy to an intervertebral disc, said catheter including at a proximal end a handle and at a distal end a probe, said catheter further comprising: a first probe section defining along the length thereof a first lumen; at least one energy delivery element located at the distal end of the catheter to deliver energy to portions of the intervertebral disc; a tip coupled to the first probe section at a terminus thereof, the tip defining on an exterior face a second lumen substantially concentric with said first lumen; and a blade positioned within the first lumen and extensible from a first position with said first probe section to a second position extending through the second lumen and beyond the tip, to cut selected portions within the intervertebral disc.

## 4. Claim : Claim 29

### Independent claim 29:

A catheter for delivering energy to an intervertebral disc, said catheter including at a proximal end a handle and at a distal end a probe, said catheter further comprising: at least one energy delivery element located at the distal end of the catheter to deliver energy to portions of the

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FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

intervertebral disc;  
a material transfer element located at the distal end of the catheter to transfer material to and from the intervertebral disc; and at least one interface on the handle for coupling the energy delivery element and the material transfer element to external devices for energy and material transfer to and from the intervertebral disc.

## 5. Claim : 34

Independent claim 34:

A catheter for delivering energy to an intervertebral disc, said catheter including at a proximal end a handle and at a distal end a probe, said catheter further comprising:  
an electrophoretic element located at the distal end of the catheter to alter the milieu within the intervertebral disc.

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Information on patent family members

International Application No

PC. JS 99/06092

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